Virtual Karshi-Khanabad Air Base (K2) Community Forum

June 25, 2024

Moderator: Elizabeth Irvin, PhD
Director, Office of Community Health Hazard Assessment
Agency for Toxic Substances and Disease Registry

Agenda

- Introduction and Opening Remarks
- Community Forum
- Megabus Act Overview
- Contaminants of Concern Report Overview
- Break
- K2 Surveillance Program
- Department of Defense K2 Update
- Question and Answer Session
- Closing Remarks

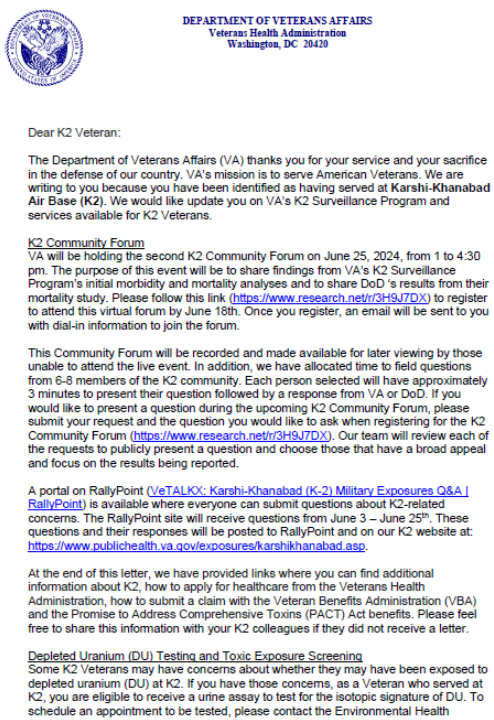
Karshi-Khanabad Community Forum

Stephanie Green, MPH
Health Outcomes Military Exposures
June 25, 2024

Invitation Letter

Invitation letter mailed early June 2024

- Included the purpose of this forum
- Presented the opportunity to be selected to ask a question during today's meeting
- Shared where to submit questions on RallyPoint
- Shared information about:
  - Depleted Uranium testing
  - Toxic Exposure Screening
  - VA's K2 surveillance program
  - Burn Pit Registry
- Provided additional resources



DEPARTMENT OF VETERANS AFFAIRS
Veterans Health Administration
Washington, DC 20420

Dear K2 Veteran:

The Department of Veterans Affairs (VA) thanks you for your service and your sacrifice in the defense of our country. VA's mission is to serve American Veterans. We are writing to you because you have been identified as having served at **Karshi-Khanabad Air Base (K2)**. We would like update you on VA's K2 Surveillance Program and services available for K2 Veterans.

K2 Community Forum
VA will be holding the second K2 Community Forum on June 25, 2024, from 1 to 4:30 pm. The purpose of this event will be to share findings from VA's K2 Surveillance Program's initial morbidity and mortality analyses and to share DoD 's results from their mortality study. Please follow this link (https://www.research.net/r/3H9J7DX) to register to attend this virtual forum by June 18th. Once you register, an email will be sent to you with dial-in information to join the forum.

This Community Forum will be recorded and made available for later viewing by those unable to attend the live event. In addition, we have allocated time to field questions from 6-8 members of the K2 community. Each person selected will have approximately 3 minutes to present their question followed by a response from VA or DoD. If you would like to present a question during the upcoming K2 Community Forum, please submit your request and the question you would like to ask when registering for the K2 Community Forum (https://www.research.net/r/3H9J7DX). Our team will review each of the requests to publicly present a question and choose those that have a broad appeal and focus on the results being reported.

A portal on RallyPoint (VeTALKX: Karshi-Khanabad (K-2) Military Exposures Q&A | RallyPoint) is available where everyone can submit questions about K2-related concerns. The RallyPoint site will receive questions from June 3 – June 25th. These questions and their responses will be posted to RallyPoint and on our K2 website at: https://www.publichealth.va.gov/exposures/karshikhanabad.asp.

At the end of this letter, we have provided links where you can find additional information about K2, how to apply for healthcare from the Veterans Health Administration, how to submit a claim with the Veteran Benefits Administration (VBA) and the Promise to Address Comprehensive Toxins (PACT) Act benefits. Please feel free to share this information with your K2 colleagues if they did not receive a letter.

Depleted Uranium (DU) Testing and Toxic Exposure Screening
Some K2 Veterans may have concerns about whether they may have been exposed to depleted uranium (DU) at K2. If you have those concerns, as a Veteran who served at K2, you are eligible to receive a urine assay to test for the isotopic signature of DU. To schedule an appointment to be tested, please contact the Environmental Health

K2 Resources – Department of Veterans Affairs

VA's general K2 web page
https://www.publichealth.va.gov/exposures/karshi-khanabad.asp

VA's K2 community forum web page
https://www.publichealth.va.gov/exposures/karshi-khanabad-forum.asp

- Find FAQs
- Find information about past forums
- Find past presentations
- Find information about research

K2 Resources - RallyPoint

https://www.rallypoint.com/answers/vetalkx-karshi-khanabad-k-2-military-exposures-q-a-ask-your-questions-below

- Ask questions
- Participate in discussions

VETERANS HEALTH ADMINISTRATION

Karshi-Khanabad (K2) Legislation

Army troops follow an airman at Karshi-Khanbad Air Base
United States Air Force, photo by Tech. Sgt. Scott T. Sturkol

Presented by: William J Culpepper II, PhD, MA
Deputy Director, Epidemiology Program
Health Outcomes of Military Exposures, PCS, VHA

Date of briefing: 25 June 2024

National Defense Authorization Act (NDAA) 2021

- Mandated DoD conduct epidemiologic study on health effects associated with deployment to K2
  - Contracted with Johns Hopkins University Applied Physics Laboratory
    - Design & conduct an epidemiology study on health (morbidity) outcomes
  - Status
    - Funding in place & JHU Personnel hired
    - Secured credentials to access VHA data systems
    - Data acquired & analyses ongoing
  - Final report anticipated by DEC 2024
- Mortality study findings to be reported later in the agenda

PL 116-315, Section 2010 (DEC 2020) – MegaBus Act

- Mandated VA contract with Agency for Toxic Substances and Disease Registry (ATSDR) to assess health effects of K-2
  - Contract ratified with ATSDR MAR 2021
  - ATSDR Completed - report on Contaminants of Concern at K2
    - Report submitted to Congress JAN 2023
    - Copy of report can be found on VA's K2 web site
  - ATSDR assist with community forum meetings
    - Actively engaged in the planning and implementation
  - Final report on the health effects associated with K2 deployment due to Congress MAR 2030
- Initial morbidity and all-cause, disease-specific mortality completed
  - Findings will be presented later in this session

Karshi Khanabad (K-2) Air Base - Public Health (va.gov)

Identification of Historical Potential Contaminants of Concern (COCs) at the Karshi-Khanabad (K2) Air Base in Uzbekistan

K2 Community Forum
June 25, 2024

Karen Scruton, MS
Aaron Young, PhD
OCHHA Exposure Investigations Section

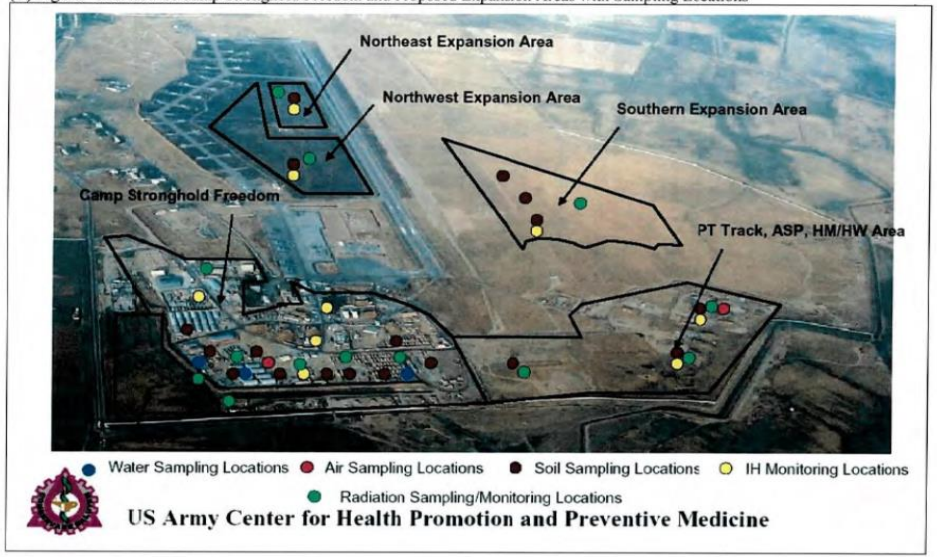
Background

- Karshi-Khanabad (K2) Air Base in Uzbekistan, also called Camp Stronghold Freedom, was a Soviet-era Air Base used for support missions in Afghanistan.
- The U.S. military operated the base from 2001 to 2005 with 15,034 Service members deployed during that time.
- Pursuant to Section 2010 of the Johnny Isakson and David P. Roe, M.D. Veterans Health Care and Benefits Improvement Act of 2020, Public Law 116-315, the Veteran's Administration (VA) entered into an agreement with ATSDR to
  - prepare a report on the exposures at K2, and
  - assess potential health effects associated with contaminants found at K2.

Data Evaluation

- ATSDR extracted sampling results from historical documents from 2001 to 2004.
- The data were included in documents produced by the Army Center for Health Promotion and Preventative Medicine – Europe (CHPPM).
- ATSDR reviewed data for
  - organic and inorganic compounds,
  - asbestos (air and water),
  - radiation (air, water, and soil),
  - pesticides (surface wipes),
  - inorganic arsenic (surface wipes), and
  - sound.

(U) Figure. Overview of Camp Stronghold Freedom and Proposed Expansion Areas with Sampling Locations



Data Evaluation Results

All data were screened using ATSDR Screening Levels

- Organic and inorganic chemicals were identified as contaminants of concern (see slides 6-11).
- All asbestos samples were below occupational standards.
- Radiation data were within the range of background levels in the area.
- Pesticides were below detection limit in surface wipes.
- Inorganic arsenic
  - had no screening level in surface wipes, and was
  - evaluated in water and soil.
- Sound was of concern based on flight operations.

ATSDR Screening Process

- Historical documents identified Contaminants of Concern (COCs) based on comparison to Military Environmental Guidelines (MEGs).
  - MEGs are used by the military to identify COCs for military personnel and were used to screen the K2 data in the 2001 to 2004 reports.
  - ATSDR used current Screening Levels (SLs) based on protecting residential adults and, therefore, are usually lower than the MEGs.
  - Maximum concentrations identified in each medium from the historical documents were compared to ATSDR's health-based SLs.
- Contaminants with maximum concentrations above the SL were identified as Contaminants of Concern (COCs), but this does NOT indicate that health effects are likely to occur.
- Additional COCs were identified using the ATSDR SLs compared to the MEGs.

Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Arsenic	None expected	Liver, kidney, lung, bladder, skin (All human)		X	X	
Benzene	Blood disorders (anemia, bleeding) (human) Changes to levels of blood antibodies and white blood cells (human) Changes in nervous system responses (mouse)	Leukemia (human)	X			X
Benzo(a)pyrene	None expected	Respiratory (human), skin and gastro-intestinal (rat/mouse)	X		X	

Potential health effects for each contaminant were identified using the following: ATSDR's Toxicological Profiles, ATSDR's Public Health Assessment Site Tool (PHAST), and EPA's Integrated Risk Information System (IRIS). *Even if someone has been exposed to these chemicals, it does not mean that they will develop these health effects. Whether or not someone will develop health effects depends on many factors including how much they were exposed to and for how long.* The health effects are identified to help the VA inform its K2 surveillance program.

Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Bromodichloro-methane	None expected	Liver, kidney, small intestine (All rat/mouse)		X		
Cadmium	Increased protein excretion from the kidneys (human) Decrease in bone density (rat) Altered pup behavior (rat)	None known		X		
Chloroform	None expected	Kidney, liver (All rat)		X		
Chromium (assumed hexavalent)	Changes in number of blood cells, anemia (rat) Changes in liver and small intestine tissues (rat) Changes in lymph nodes (mouse)	Lung and stomach (human), small intestine (mouse), mouth (rat)		X		

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Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Copper	Abdominal pain, vomiting, nausea (human) Reduced antibodies (human) Increased salivation (human)	None known		X		
Cumene (isopropyl benzene)	Increased kidney and adrenal gland weight (rat)	None known				X
Di(2-ethylhexyl) phthalate	Decreased estrogen during pregnancy and accelerated maturing of eggs (mouse) Increased liver weight and changes in enzymes (rat) Increased immune response in animals (mouse) Impaired learning, memory, and reduced motor skills (mouse)	Liver, pancreatic, testicular (All rat)			X	

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Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Ethylbenzene	Hearing loss (rat) Kidney damage (rat) Changes in liver enzymes (rat)	None known				X
Kerosene	Reduced motor skills (rat) Effects on liver function (rat)	None known	X			
Lead	Reduced fetal growth and lower birth weights, permanent adverse effects on the developing brain and lower IQ (human) High blood pressure (human) Decreased kidney function (human)	None known		X		
Methylene chloride	Not above SL	Liver, lung, breast (All rat)	X		X	

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Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Naphthalene	Altered central nervous system function (rat) Effects on cells lining the respiratory system (rat and mouse)	Respiratory (rat/mouse)	X			
Particulate matter less than 10 microns (PM10)	Worsening asthma, bronchitis, decreased lung function (human) Increased risk of heart attack (human)	None known	X			
Total phosphorus	Lethargy and loss of appetite (human) Decreased number offspring and an increased incidence of stillborn births (rat) Increased tremors during pregnancy (rat) Reduction of number of liver cells (rat)	None known		X		

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Health Effects Associated with COCs by Medium

Potential Health Effects			Medium Sampled			
COC	**Non-Cancer Effects**	**Cancer Type**	**Air**	**Water**	**Soil**	**Soil Gas**
Tetrachloroethylene	None expected	Bladder, non-Hodgkin's lymphoma, leukemia, respiratory, cervical, breast (All human), liver (mouse), kidney (rat)	X			
Trimethylbenzenes 1,2,3-TMB; 1,2,4-TMB; and 1,3,5-TMB	Decreased detection of pain (rat) Cellular changes and decreased clotting time in blood (rat) Inflammation of lung tissue (rat)	None known	X			X
Xylenes, total	Increase in anxiety and forgetfulness (human) Irritation of the nose and sore throat (human) Increased nausea and poor appetite (human)	None known				X

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Additional COCs Resulting from ATSDR Screening

	Media			
Contaminant	**Air**	**Water**	**Soil**	**Soil Gas**
Volatile Organic Compounds (VOCs)				
Benzene	X	--	--	--
Bromodichloromethane	--	X	--	--
Cumene (isopropylbenzene)	--	--	--	X
Methylene chloride	X	--	--	--
1,2,3-trimethylbenzene	X	--	--	X
1,3,5-trimethylbenzene	X	--	--	X
Chloroform	--	X	--	--
Semi-volatile Organic Compounds (SVOCs)				
Benzo(a)pyrene	X	--	X	--
Di(ethylhexyl)phthalate	--	--	X	--
Naphthalene (o)	X	--	--	--
Inorganics				
Arsenic	--	X	X	--
Cadmium	--	X	--	--
Copper	--	X	--	--
Total phosphorus	--	X	--	--
Chromium (assume CrVI)	--	X	X	--

Propylbenzene and xylene were identified as COCs in the CHPPM document but not for the ATSDR screening

Uranium and Radiation Assessment

- The military identified depleted uranium (DU) in soil in 2001 at the former Missile Storage Site (Site 1), which is outside the military protection berm area.
  - Access to Site 1 was declared “off-limits” from use in 2001.

- The military measured radiation in soil, air, and wipes within the military protection berm in 2001.
  - All results were either non-detect or considered to be below background levels.

Limitations and Conclusions

- ATSDR recognizes that data at K2 are limited to specific areas of the base and times of testing and may not fully represent levels of exposure to contaminants by service members at K2.
- ATSDR identified additional COCs in this report as compared to the K2 documents because the SLs used by ATSDR were generally lower than the MEGs.
- The health effects associated with the COCs identified by the ATSDR screening were used by the VA for consideration in the K2 Surveillance Program (K2SP).

Thank you for attending!

For more information, contact NCEH/ATSDR
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.atsdr.cdc.gov www.cdc.gov
Follow us on Twitter @CDCEnvironment

** BREAK ***

The next presentation will begin in 10 minutes

VETERANS HEALTH ADMINISTRATION

Karshi-Khanabad Surveillance Program (K2SP)

Army troops follow an airman at Karshi-Khanbad Air Base
United States Air Force, photo by Tech. Sgt. Scott T. Sturkol

Presented by: William J Culpepper II, PhD, MA
Deputy Director, Epidemiology Program
Health Outcomes of Military Exposures, PCS, VHA

Date: June 25, 2024

K2 History

- Former Soviet Airbase in SW Uzbekistan
- Occupied by US Forces 2001 – 2005 to support operations in Afghanistan (OEF)
- Environmental Risk Assessments (2001, 2002, 2004)
  - Heat, noise, and particulate matter (dust)
  - Exposures documented: jet fuel, asbestos, depleted uranium, and possible nerve and blister agents
    - No “yellow cake”
    - Over 328 urine assays for uranium DU completed
    - All are negative; no radioactive isotopes for enriched or depleted uranium
    - “Skittles Ponds” – water with fuels/oil sheen
  - Concentrations were low; contaminated areas were remediated
  - Assessment: risks were low and long-term medical monitoring was not needed (US Army Public Health Center Technical Information Paper 98-123-0720, updated July 2020)
- Remediation Efforts
  - Fenced-off areas with known or suspected contaminants
  - Fresh soil spread over areas with ground-based contaminants
  - Berms created to contain contaminants that might leach into the ground

K2 Research History

- Because of increasing health concerns from Service members that deployed to K2
  - In 2012, Army Public Health Branch directed to conduct a study to assess possible health effects associated with K2 deployment
- Cancer incidence study (2015)[1]
  - Limited to AD Service members
  - Maximum of 10 yrs. post deployment follow-up (avg ≈ 7 yrs.)
  - K2 SMs compared to S. Korea SMs (n=7,100) that served during the K2 occupation
  - Used MHS medical records data to identify disease outcomes
  - After adjustment only melanoma and hemopoietic cancers showed a higher incidence in K2 SMs
  - Majority of cancers and other health conditions had a lower risk in K2 Service members
- There were only a few cases of each hemopoietic cancer (leukemias and lymphoma)
  - 7 (K2) & 6 (S. Korea)
- Results inconclusive, but concerning given the young age of this cohort

1- Sharkey & Abraham. Milt Med 2015; Jul-Sep; 68-75.

K2 Legislation

- "MegaBus Act" PL 116-315, Section 2010 passed DEC 2020, mandated VA contract with ATSDR to assess health effects of K-2
  - ATSDR provided report on Contaminants of Concern at K2 (based on DoD site surveys), report sent to Congress JAN 2023
  - ATSDR to assist with community forum meetings

- K2 Surveillance Program (K2SP)
  - VA (Epidemiology Program, HOME) initiated K2SP May 2022
  - Will assess and follow morbidity & mortality over the next 10^{+} years

Karshi Khanabad (K-2) Air Base - Public Health (va.gov)

K2 Surveillance Program (K2SP)

- A surveillance approach to assessing K2 health outcomes required
  - Relatively young age of K2 cohort
  - Intermediate level of follow-up (maximum follow-up = 22yrs)
  - Long latency for most chronic diseases and cancers
  - Surveys are not always representative as they are voluntary

- Surveillance requirements
  - Identify K2 veterans and service members (the exposure cohort)
  - Identify an appropriate comparison group(s)
  - Ensure complete capture or morbidity and mortality outcomes
  - Be repeatable and sustainable

- K2 cohort
  - Worked with DoD, VHA, and VBA colleagues to identify K2 cohort
  - Identified two comparison groups
    - OEF deployed, but never to K2 during the K2 occupation
    - OEF era, never deployed to anywhere in SW Asia during the K2 occupation

- Morbidity & Mortality data for entire K2 cohort
  - Morbidity data derived from healthcare encounters in MHS and VHA
  - Mortality data from Mortality Data Repository (MDR)

K2 Surveillance Program (K2SP)

- As of MAR 2023, 15,035 were identified as having any K2 deployment
- Of these, 12,203 (81%) were veterans with confirmed deployment to K2 and available for study
  - 10,203 (84%) enrolled in VA Healthcare
  - 10,257 have submitted claims and 96% of claims are granted
  - Most common claimed conditions - hearing loss, tinnitus, back/neck/knee pain
- Two comparison groups: (1) OEF deployed but never to K-2 and (2) OEF-era never deployed to SW Asia
  - 5:1 “controls” per case in each comparison group
  - Matched on
    - Age
    - Sex
    - Race
    - Branch of service
    - Component (active, NG, Reserves)
    - VHA utilization status

Step	Description	Count
1	Central Command Roster	10,401
2	DMDC/ VADIR[1] – UZB deployment	10,814
3	subtotal (1+2)	21,215
4	duplicates	-6,039
5	Civilian-only	-69
6	bad SSN	-72
7	**K2 Master Roster**	**15,035**
8	Not confirmed[2]	-2,832
9	**K2SP**	**12,203**

1. DMDC = Defense Manpower Data Center; VADIR = VA Data Identification Record.
2. Remain on active duty and/or special operations.

K2 Surveillance Program (K2SP)

- Outcomes selection based on:
  - Prior research in Southwest Asia deployed populations (GW, OEF/OIF)
  - Health concerns associated with known contaminants at K2
  - The most frequent disease-specific claims among K2 veterans

- Morbidity outcomes
  - Defined by ICD 9 & 10 diagnoses codes
  - Scanned the Military Health System and VHA health encounter database : 2000 – 2022

- Mortality Data Repository for mortality assessments & comparisons
  - Date and cause of death among ALL Service members and Veterans
  - 1979 through 2021

- Morbidity & Mortality data updated annually & will be analyzed over the next 10 years

- Allows for rapid response to emerging health concerns

Initial Findings

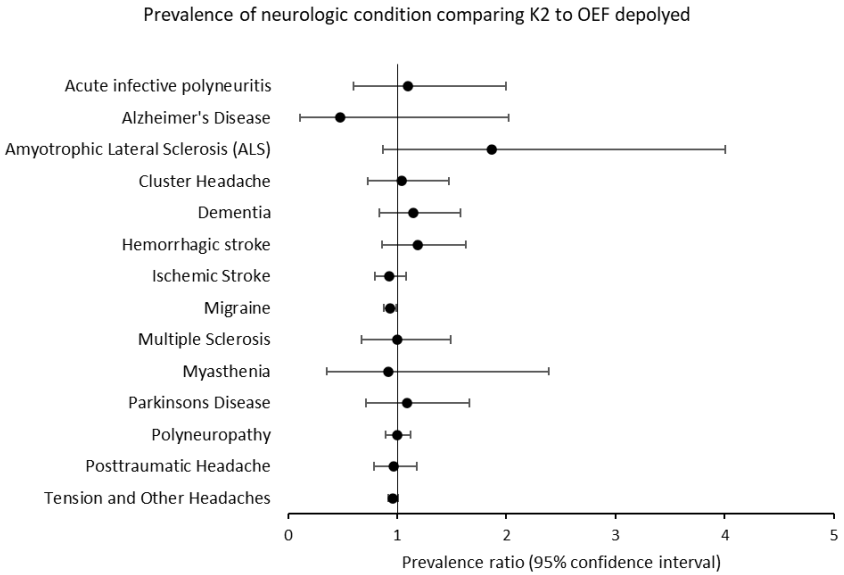
Morbidity and All-cause, Disease-specific Mortality

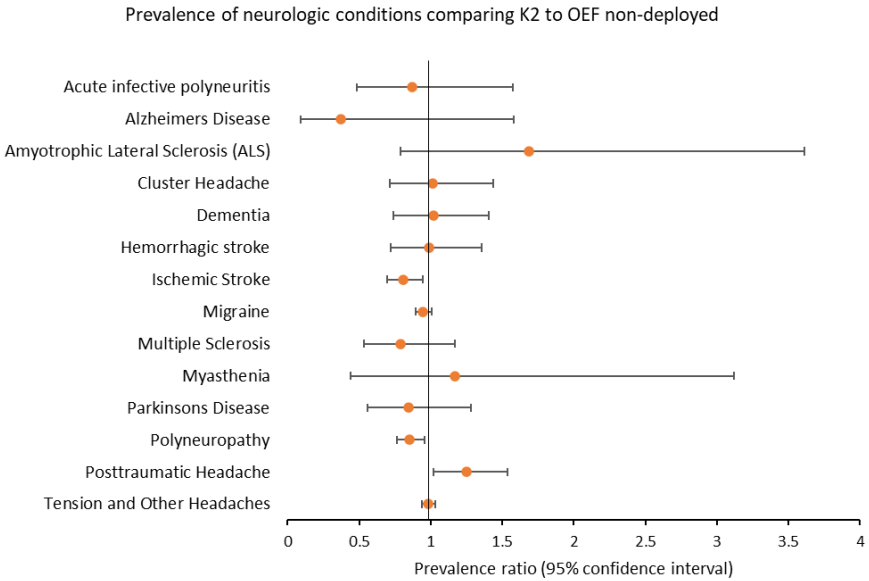
K2SP – Population Characteristics

		K2	OEF deployed	OEF era
Sample Size (#)		12,203	61,015	61,015
Age Category (%)	<= 40	8.74	9.3	9.1
	41-45	25.1	25.5	25.5
	46-50	19.1	18.2	19.1
	51-60	33.1	33.4	32.3
	Over 60	14.0	13.7	13.8
Race (%)	Black	13.2	13.2	13.5
	White	73.2	73.3	72.7
	Other	13.6	13.6	13.9
Sex (%)	Male	90.9	90.9	90.9
Rank (%)	Enlisted	87.3	89.8	86.7
	Officer	12.7	10.3	13.3
Deployed Pre 9/11 (%)		21.9	21.7	21.6
Duration of Service (%)	0-3 years	1.0	1.2	0.6
	3-5 years	8.9	9.7	8.1
	5-8 years	10.1	10.3	9.7
	over 8 years	80.0	78.8	81.6
Branch of Service[1] (%)	Army	27.7	28.2	28.5
	Air Force	44.9	46.7	43.3
	Marine Corps	2.9	2.8	3.1
	Army Reserve/NG	10.5	9.8	11.3
	Air Force Reserve/NG	12.5	10.8	10.9
	Other	1.6	1.7	2.9

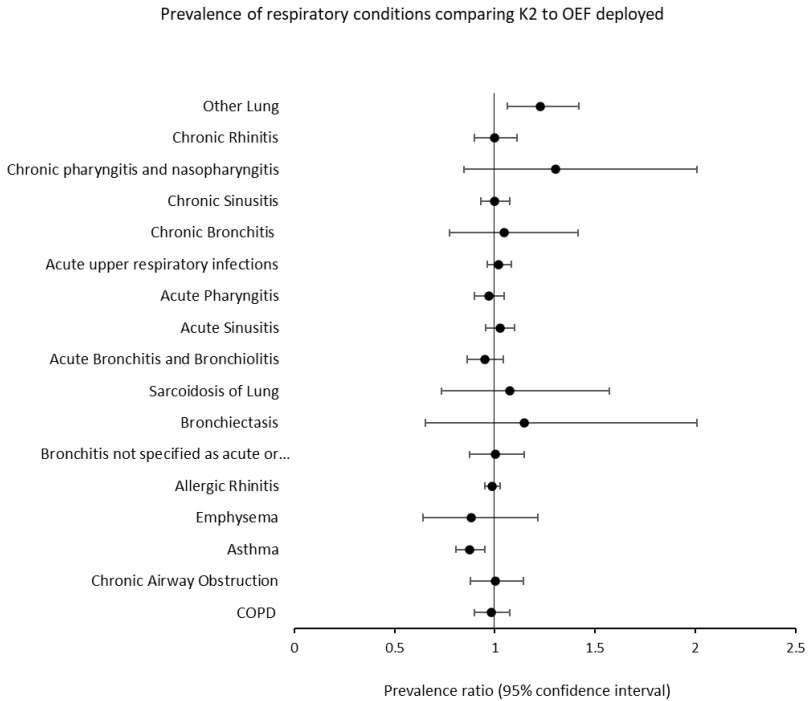
1-Initial Branch of service during the K2 occupation (2001 – 2005).

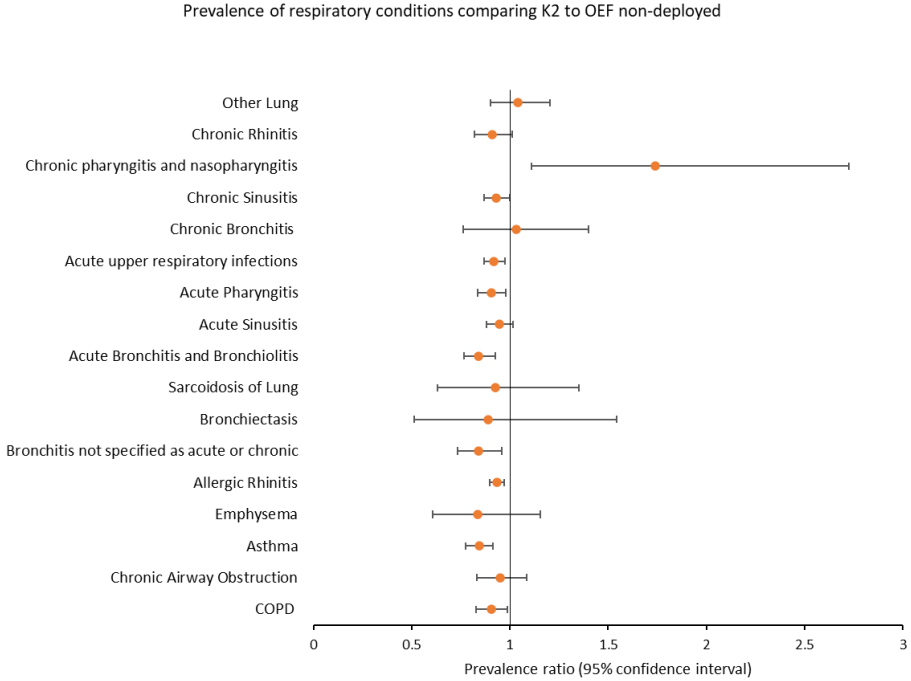
K2SP – Neurologic Outcomes



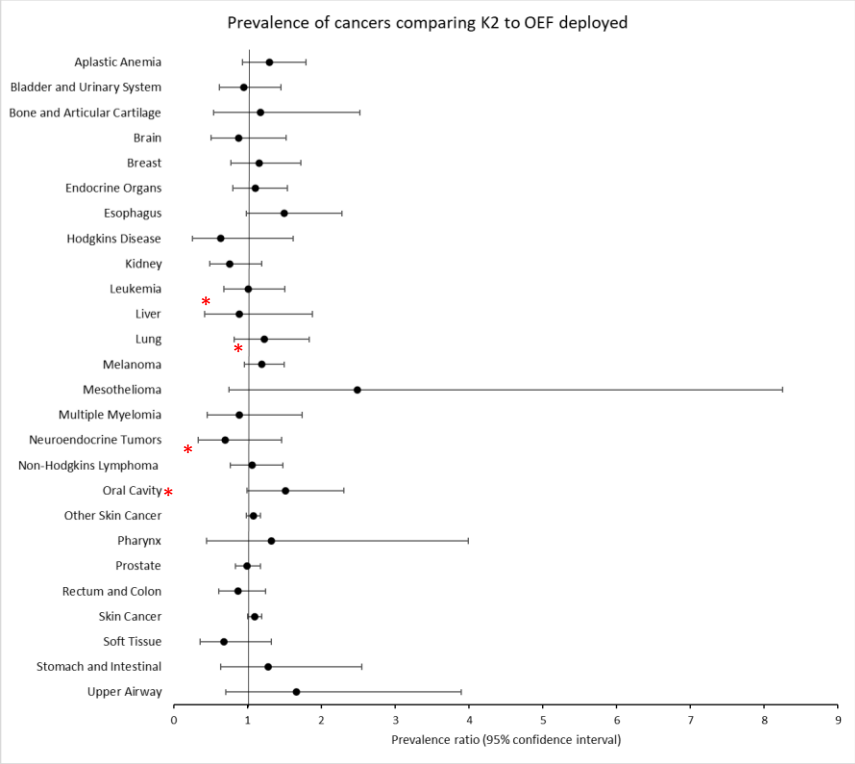


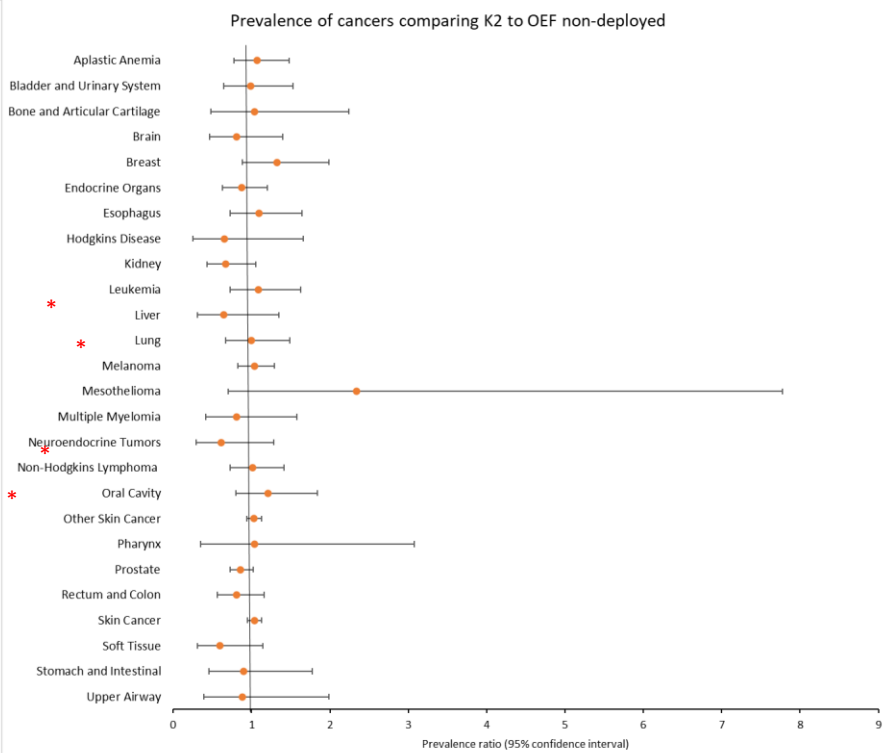
K2SP – Respiratory Outcomes





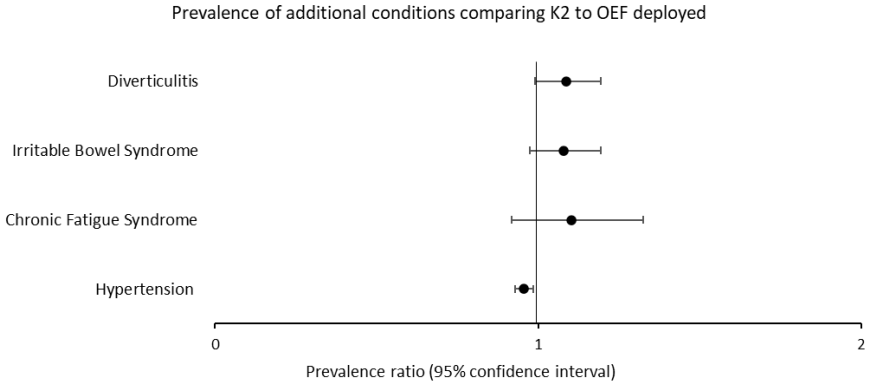
K2SP – Cancer Outcomes

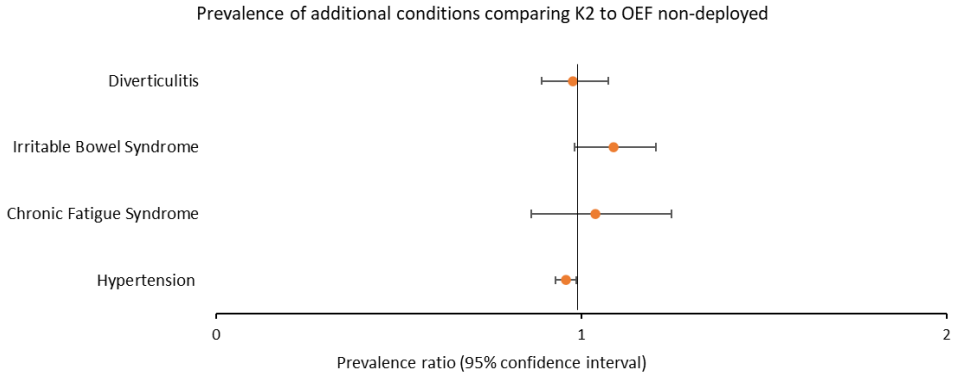




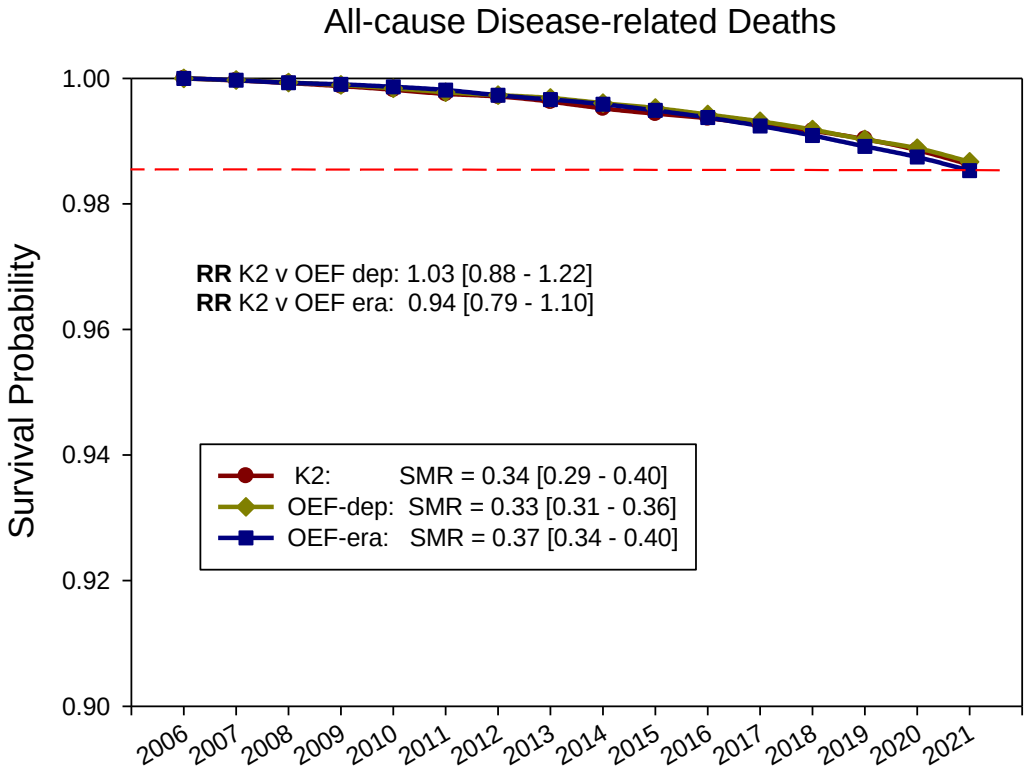
* - hemopoietic cancers like reported by Sharkey & Abraham. Milt Med 2015; Jul-Sep; 68-75.

K2SP – Additional Outcomes





K2SP – All-cause disease specific mortality

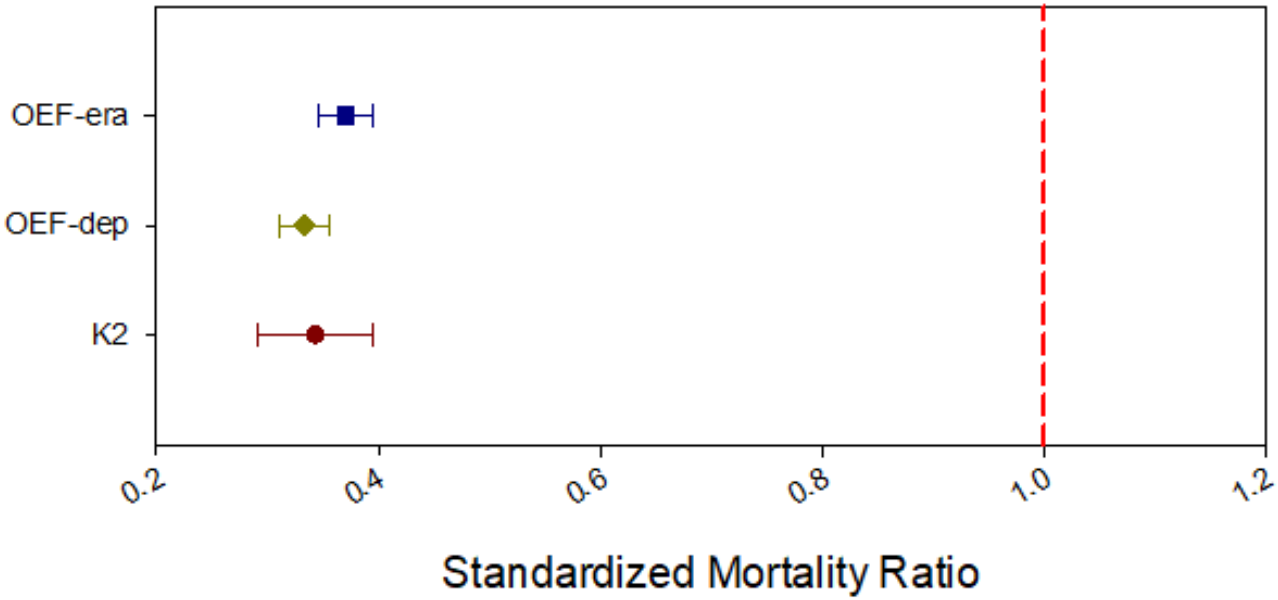


Survival probability was greater than 97% in all three groups (red dashed line).

There was no difference in the mortality risk (RR) between K2 and each of the comparison groups

Standardized mortality ratios (SMR) compare the mortality in each of the K2 Surveillance Program groups to the general US population (see box in Figure). Compared to the general population, the mortality risk was substantially lower in all three groups (SMRs all less than 0.40).

K2SP – All-cause disease specific mortality



K2SP - Conclusions

- This is the first of many reports from the K2SP assessing possible health effects associated with K2 deployment
- Overall, there was no increased health risks associated with K2 deployment
  - Disease prevalence was lower or no different than the OEF-deployed and OEF-nondeployed comparison groups for the disease assessed
  - The mortality rate was no different between the K2SP groups
  - Mortality rates were substantially lower in all the K2SP compared to the general US population
- No evidence of exposure to enriched uranium at K2
  - Hemopoietic cancers (lymphoma, leukemia, multiple myeloma) have been associated with radiation exposure
  - No increased risk of these cancers in the K2 cohort
  - To date, 334 urine samples have been analyzed for the presence of any type of uranium, all have been negative
- Summary
  - At present, no evidence to suggest that K2 deployment is associated with an increased risk of disease or mortality
  - Additional assessments needed before firm conclusions about K2 health effects can be reached
    - Young age of the K2 cohort
    - Long latency of disease and deaths
    - Intermediate follow-up duration

Other K2 Actions and Next Steps

- K2 Veterans are eligible for all the PACT Act presumptions
- K2 Veterans eligible for enrollment in the Airbourne Hazards Open Burn Pit Registry
- K2 Veterans are eligible for DU testing at no cost
  - Of the 334 analyzed to date, all had a Negative DU isotopic signature
- Finalize Morbidity report
  - Neurological, Respiratory, Cancers, HTN, CFS, IBS,
  - Sensitivity analysis among those without deployments during the follow-up period
- Cause-specific Mortality analyses
  - Accidents, homicides, suicides
  - Neurological, Respiratory, Cancers, HTN, CFS, IBS
- Annual K2 Community Forum
  - Update on findings from K2 Surveillance Program & DoD Epidemiologic studies
  - Update on Surveillance activities

Update on Department of Defense Mortality Study of U.S. Service Members Deployed to Karshi-Khanabad (K2) Air Base, Uzbekistan, Oct 2001 – Dec 2005

June 24, 2024

Background K2 Air Base

- Former Soviet refueling base supporting military operations in Afghanistan
- Utilized by U.S. Oct 2001 to Dec 2005 to support OEF in Afghanistan
- Over 15,000 U.S. Service members deployed to K2 late 2001 through 2005

- Pre-operational environmental surveys identified potential hazards
  - Particulate matter (dust); ubiquitous
  - Ground jet fuel plumes from broken Soviet era fuel distribution system
  - Volatile Organic Hydrocarbons; under OSHA maximum exposure limits
  - Low level radiation; depleted uranium (DU) of Soviet origin
  - Lead-based paint and asbestos tiles; in area not occupied by U.S. forces

- Hazards mitigations
  - Restricting access (asbestos, lead, DU)
  - Cover area with clean fill (DU)
  - Filled trench with clean soil to cap jet fuel vapors

- Concerns regarding adverse health outcomes of Service members who deployed to K2 have been raised by CENTCOM and SOCOM as well as various Veterans' groups

Previous K2 Studies (2010 & 2015)

- Initial 2010 Army Public Health Command (APHC) study evaluated if Service Members (SMs) deployed to K2 had increased chronic diseases compared to SMs in South Korea during time K2 was operational (Oct 2001 – Dec 2005)
  - Results: K2 SMs no more likely to experience studied adverse health outcomes (cardiac, pulmonary, mental health, and cancers) than SMs in South Korea.
  - Multiple limitations; identified need for more systematic study
- Follow up K2 study conducted by APHC in 2015
  - K2 deployers with lower incidence of cardiovascular, pulmonary, and mental health diagnoses. Overall cancer incidence was the same
  - Potential weak association between K2 deployment and specific cancers (melanoma and lymphatic cancers); lacked evidence to establish causal relationship between K2 deployment and increased rates of these cancers

K2 Mortality Study

- NDAA 2021 Sec. 751; study on exposure to toxic substances by Service members who deployed to K2, at any time October 1, 2001 to December 31, 2005
- Executive Order issued on January 19, 2021; study on toxic exposure by members of the Armed Forces deployed to K2
  - DoD contracted with federal research partner, Johns Hopkins University Applied Physics Laboratory (ALP) to conduct this larger K2 study
  - Significant time to establish contract and for JHU APL to gain needed access to the VA electronic health record (EHR)
- K2 Mortality Study conceived as an interim (first step) study DoD could conduct internally in advance of larger K2 morbidity by APL
- Why a mortality study?
  - The first step in establishing if causal link is between a remote exposure and adverse health outcomes is to choose the most severe, objectively definable adverse outcome; all-cause mortality (death from any cause)

K2 Mortality Study Population

- Collaboration between DoD and VA identified 15,033 Service members who deployed to K2; multiple data sources
  - CENTCOM K2 roster
  - Defense Manpower Data Center (DMDC) - DoD
  - VA Department of Defense Identity Repository (VADIR) – VA
  - Deaths identified via the National Death Index (NDI)

- Study limited to individuals born between 1955 and 1985
  - Exposed group: 14,447 Service members deployed to K2
  - Comparison group: 3,319,750 Service members who could have potentially deployed to K2 (but did not)

Variable	Crude Mortality Ratio	95 % CI	
K2 Service			
No K2 Service	Reference		
K2 Service	0.70	0.62	0.78
Sex			
Male	Reference		
Female	0.59	0.58	0.61
Birth Cohort			
1955 - 1960	2.27	2.21	2.32
1961 - 1965	1.42	1.39	1.45
1966 - 1970	0.86	0.83	0.88
1971 - 1975	0.75	0.73	0.77
1976 - 1980	0.90	0.88	0.92
1981 - 1985	Reference		
Race/Ethnic group			
Non-Hispanic White	Reference		
Non-Hispanic Black	0.99	0.97	1.01
Hispanic	0.69	0.67	0.71
Asian/Pacific Islander	0.69	0.66	0.73
Other	1.51	1.47	1.55
Component			
Active	Reference		
Reserve	1.05	1.03	1.07
National Guard	1.19	1.17	1.21
Unknown	0.02	N/A	N/A
Service			
Army	Reference		
Navy	0.83	0.82	0.85
Air Force	0.57	0.56	0.58
Marines	0.98	0.95	1.00
Coast Guard	0.58	0.55	0.61
K2 Length of service (days)			
001-030	Reference		
031-090	0.90	0.62	1.31
091-180	0.92	0.64	1.33
181+	1.03	0.68	1.57

Table 3: Crude and adjusted All- cause mortality risk of Karshi-Khanabad (K2) Exposure, 2001- 2019

	Mortality Ratio	95%CI	
Crude	0.70	0.62	0.78
Fully Adjusted Model 1[1]	0.84	0.61	1.15

1. Adjusted for sex, Birth cohort, race/ethnic group, Military component, branch of service, length of K2 service.

Prepared by Armed Forces Health Surveillance Division
Public Health Directorate, Defense Health Agency
Source: Defense Medical Surveillance System (DMSS), National Death Index (NDI), Defense Manpower Data Center (DMDC), January 2022.

Results of K2 Mortality Study

- Results: analysis failed to demonstrate an association between K2 service and increased all-cause mortality (death from any cause)

- Crude all-cause mortality risk for K2 deployment: 0.70 (0.62 - 0.78)
  - < 1.0 indicates no increased risk

- Crude mortality risk factors: 1) Increased age, 2) Male, 3) National Guard or Reserve component, 4) Army or Marine Corps

- Adjusted all-cause mortality risk for K2 deployment: 0.84 (0.61 - 1.15)
  - Adjusted for: sex, birth cohort, race/ethnicity, component, branch of Service, and length of K2 deployment

Mortality Study Limitation

- Study results do NOT indicate a lack of evidence that K2 deployers may have increased rates of adverse health outcomes
- Subtle association between K2 deployment and adverse health outcomes, not associated with death, cannot be excluded
- Limitations of study:
  - Lack of sensitivity to subtle adverse health outcomes not resulting in death
  - Lack of individual environmental exposure data
- Follow-on morbidity studied necessary to address these issues
- K2 mortality study report to Congress has been posted to the Defense Technical Information Center (DTIC) with restricted access; DHA currently working to post the report to public facing website

K2 Morbidity Study by JHU APL

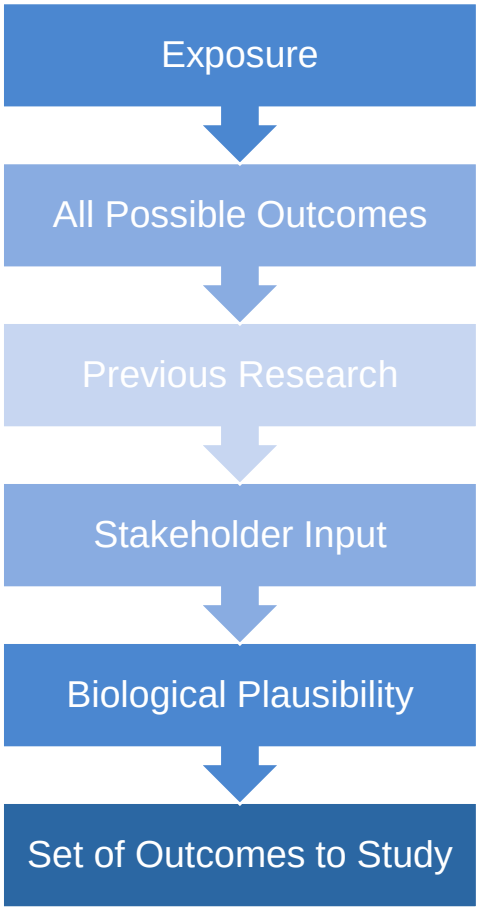
- Study mandated by NDAA 2021 Sec. 751; "*Study on exposure to toxic substances by Service Members who deployed to K2*"

- The Morbidly Study is being conducted by a DoD research partner, Johns Hopkins Applied Physics Laboratory (JHU APL)

- Overall study goal: Retrospective study on health outcomes of Service members stationed at K2 to assess for increased rates of specific-cause morbidity and mortality

- Study combines data from DoD with data from VA to include data extracted from the VA electronic health record

Morbidity Study Outcomes Selection



Selected Outcomes	Motivators for Selection		
	Review of Environmental Assessments	Prior K2 Studies	Concerns of Stakeholders
1. Bladder cancer	X		X
2. Colon cancer (under 55 yrs)	X	X	X
3. Glioblastoma	X	X	X
4. Hematopoietic cancer*	X	X	X
5. Kidney cancer	X		X
6. Liver cancer	X		X
7. Melanoma	X	X	X
8. Pancreatic cancer			X
9. Prostate cancer (under 55 yrs)	X	X	X
10. Multiple sclerosis			X
11. Hearing loss (under 50 yrs)	X		X

*This includes: leukemia, lymphoma, myeloma

Timeline

- JHU APL Mortality Study initiated October 2021
  - 3 Phases:
    1) Study Design & Data Collection
    2) Data Analysis
    3) Report
  - Nearing completion of data analysis

- Final report expected to be provided to Congress late 2024 with a release to the public thereafter

Question and Answer Session

- We have several individuals who will present their comments/question.
- Comments/Question presentation is limited to three minutes.
  - We ask that this time slot be respected as presenters will be muted after three minutes.
- Reponses to each question will be presented.
- Responses will be posted to the VA K2 website.

Closing Remarks

- Future meetings will take place annually
- Questions and Answers will be posted to the VA K2 web page
- Resources
  - VA's K2 web page: https://www.publichealth.va.gov/exposures/karshi-khanabad.asp
  - RallyPoint: https://www.rallypoint.com/answers/vetalkx-karshi-khanabad-k-2-military-exposuresq-a